

Separation of Acidic and Neutral Drugs Using a Core Enhanced Technology Accucore HPLC Column

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Abstract

This application note demonstrates the use of the Thermo Scientific Accucore C18 column for the separation of acidic and neutral drugs.

Introduction

Therapeutic monitoring of drugs is very important in the pharmaceutical industries as compliance with the FDA regulations is required. Chromatography of acidic drugs can be problematic as they can exhibit peak tailing due to interaction with active sites on the stationary phase of column. Accucore™ HPLC columns use Core Enhanced Technology to facilitate fast and high efficiency separations. The 2.6 µm diameter particles are not totally porous, but rather have a solid core and a porous outer layer. The optimised phase bonding creates a series of high coverage, robust phases. The carbon loading of Accucore C18 provides high retention of non-polar analytes via a predominantly hydrophobic interaction mechanism, enabling the separation of a broad range of analytes. The tightly controlled 2.6 µm diameter of Accucore particles results in much lower backpressures than typically seen with sub-2 µm materials. These columns have shown to give an excellent peak shapes for acidic and neutral drugs in acidic conditions.



Sample Preparation

A 1000 µg/mL mixture of acidic and neutral drugs (listed in Table 1) was prepared in 1:1 Far UV Acetonitrile/water; this solution was then diluted in water to the required concentration for analysis (stated in Table 1)

Thermo Scientific Column	Part Number
Accucore C18 2.6 µm 100 x 2.1 mm	17126-102130
Measured backpressure: 256 bar	

Thermo Scientific Accela HPLC/UHPLC

Column temperature	25 °C
Injection volume	1.5 µL
Flow rate	0.40 mL/min
PDA/UV detection	215 nm

Mobile Phase

A: 0.1% Phosphoric acid Water

B: 0.1% Phosphoric acid Far UV Acetonitrile

Gradient:

Time/min	A	B
0	70	30
2	60	40
4	5	95
8	5	95

Consumables	Part Number
Fisher Scientific HPLC grade water	W/0106/17
Fisher Scientific HPLC grade Far UV acetonitrile	268260025
HPLC grade phosphoric acid, Fisher Scientific	0/0515/PB08
Liquid handling hardware: FinnPipette (100-1000 µL)	642090
NSC Mass Spec Certified 2 mL clear vial with PTFE silicone cap	MSCERT4000-34W

Key Words

- Accucore C18
- Superficially porous
- Core Enhanced Technology
- Acidic and neutral drugs
- Fused core

Results

Figure 1 shows the chromatogram of acidic and neutral drugs separated on an Accucore C18 2.6 µm 100 x 2.1 mm column. The analysis demonstrates this column can provide not only a good baseline resolution but excellent retention time reproducibility when these drugs are separated.

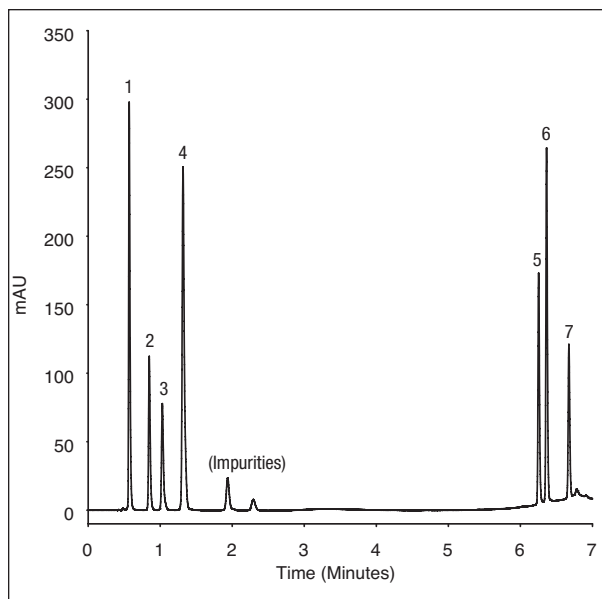


Figure 1: Chromatogram of acidic and neutral drugs separated on an Accucore C18 2.6 µm 100 x 2.1 mm column

	Compounds	Sample Concentration (µg/mL)	t _r /min	%RSD (t _r /min) n=6
1	Hydrochlorothiazide	20	0.57	0.13
2	Prednisolone	50	0.85	0.19
3	Pravastatin	50	1.03	0.27
4	Carbamazepine	20	1.32	0.20
5	Diclofenac	20	6.29	0.59
6	Ibuprofen	50	6.40	0.57
7	Progesterone	50	6.71	0.54

Table 1: The analysis of acidic and neutral drugs on an Accucore C18 2.6 µm 100 x 2.1 mm column

Conclusions

The separation of acidic and neutral drugs was successfully achieved on Accucore C18 column, providing an excellent choice for the analysis of these drugs giving excellent retention time reproducibility and resolution.

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